



UKLANJANJE ARSENA IZ VODE POMOĆU PESKA OBOGAĆENOG MAGNEZIJUMOM I ALUMINIJUMOM REMOVAL OF ARSENIC FROM WATER BY THE SAND MICROALLOYED WITH MAGNESIUM AND ALUMINIUM

SAŽETAK

Ispitivana je mogućnost da se hemijski i termički obrađeni kvarcni pesak (Rgotina, Srbija) koristi kao agens za uklanjanje arsena iz vode.

Rezultati ispitivanja pokazali su da se postupkom mikrolegiranja kvarcnog peska sa Mg and Al, koji je opisan u ovome radu, dobija elektrohemijski aktivan materijal velike specifične površine.

Takođe je utvrđeno da taj mikrolegirani kvarcni pesak u 150 minutnom kontaktu sa modelnim vodenim rastvorom As(V), uz povremeno mešanje (svakih 10 min po 10 s), smanjuje početnu koncentraciju arsena za oko 20 puta (sa 200 µg As(V) L⁻¹ na 9,3 µg As(V) L⁻¹).

Arsen se iz vodenog rastvora uklanja redukciono-adsorpcionim i sorpcionim procesima izazvanim rastvaranjem Mg i Al (koji imaju veoma negativne standardne potencijale u vodi) sa površine mikrolegiranog peska što obezbeđuje elektrone za redukciju najvećeg dela arsenovih vrsta u vodi do atomskog arsena.

Ključne reči: Arsen, voda za piće, pesak, koncentracija aluminijuma i magnezijuma, pH vrednost, Rgotina-Srbija

ABSTRACT

The aim of this work was to investigate the possibility of using chemically and thermally treated quartz sand (Rgotina, Serbia) as an active agent for arsenic removal from waters.

Experimental results have shown that the treatment of quartz sand by microalloying with Mg and Al, described in this work, produced electrochemically active material with large specific area.

It was found that microalloyed quartz sand in contact with arsenic(V) model water solution for 150 minutes, with periodic steering (every 10 min for 10 s), decreased the arsenic concentration by a factor of 20 (from 200 µg As(V)L⁻¹ to 9,3 µg As(V)L⁻¹).

Arsenic was removed from model water solutions by adsorption-reduction and sorption processes induced by Mg and Al (having very negative standard electrochemical potentials) dissolution from the microalloyed sand surface which supplied electrons for the reduction of most of the arsenic species to atomic arsenic.

Key words: Arsenic, drinking water, sand, aluminum and magnesium concentration, pH, Rgotin-Serbia

1. UVOD

Arsen je prirodno prisutan element u hrani, vodi i vazduhu. Vekovima je poznat kao otrov, ali u nekim eksperimentima na životinjama pokazao se kao neopходan element pri niskim koncentracijama. Na drugoj strani, savremenija istraživanja i ispitivanja su pokazala da arsen izaziva promene na koži koje mogu biti maligne, kancer bubrega, mokraćne bešike, jetre, pluća i drugih organa [1]. Poznat je i uticaj arsena na vaskularni sistem, koji se u svojoj najurovijoj formi

1. INTRODUCTION

Arsenic is an element naturally present in food, water and air. For centuries it was known as a poison, but the experiments with some animals have shown that in very small concentrations it is a necessary participant in their metabolism. However, the contemporary research with humans has shown that arsenic provokes malignant skin changes, cancers of kidneys, bladder, liver, lungs and other organs [1]. The influence of arsenic on the human vascular system, which

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